

VERTEBRAL SURGERY, WITH REPORTS OF THREE CASES, AND A NEW METHOD OF OPERAT- ING IN THE DORSAL REGION.

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Operations upon the spine are called for in cases of: First, traumatism; second, neoplasms; third, caries. It is my desire to occupy a few moments of your time by briefly reporting three cases of the third class, and giving the result of operations upon the cadaver, done with a view of ascertaining how to attack the diseased bodies of the vertebrae with the least degree of danger to or disturbance of the spinal cord in the dorsal region. Among the most troublesome cases the surgeon has to contend with we may safely place caries of the vertebrae, and especially the tubercular variety. During the past two years it has fallen to my lot to treat a number of these, three of which I will report at the present time as germane to the topic, viz.: "Operations upon the spine for caries of the bodies of the vertebrae."

History.—Case 1. Miss C. J., age 29 years, admitted into Wesley Hospital Nov. 13, 1889; well nourished. Three years ago was treated for rheumatic fever. Has had pain in her back, over lower dorsal region, from that time to the present. Has always had a weak back. Two months ago the pain began to grow worse. Three weeks later she noticed a slight swelling behind the pelvis under the crest of the ilium.

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Examination.—There is a large swelling in the gluteal (right) region, hemispherical in form, about $5\frac{1}{2}$ inches in diameter at its base. There is also another swelling of considerable size in the right iliac region. Upon palpation fluctuation is elicited in both tumors, and a communicating wave can be distinctly felt projected from one tumor into the other over the crest of the ilium. She cannot sit erect. When she makes the effort it gives her great pain in the back. Pressure upon the spinous processes of the tenth and eleventh vertebræ (dorsal) makes her shriek and complain of great suffering in the corresponding portion of the spine; feels most comfortable with her body bent forward and thighs flexed upon the trunk. She occasionally has pain in the course of distribution of the branches of the anterior crural nerves. Cannot walk without support, and then with great effort of will. Temperature, 100° F. Pulse, 84.

Diagnosis.—Caries of the body of the tenth or eleventh dorsal vertebræ, or both, with psoas abscess.

Treatment.—With antiseptic precautions I aspirated the gluteal abscess in the presence of Drs. McNamara and Lorman, withdrawing fully a quart of fluid, and immediately injected a preparation of iodoform with glycerine and alcohol, and closed the wound with sublimated gauze, sealed with collodion. For about one week she was much relieved of pain, but the abscess cavity gradually filled up, and her temperature varied from 99° to $102\frac{1}{2}^{\circ}$ until Dec. 27, when she seemed to be in a worse condition than when she entered the hospital. I now decided to drain the cavities, and if possible attack the seat of disease. Made one incision above the crest of the ilium, over the interval between the latissimus dorsi and external oblique muscles, the point through which the two abscess tumors communicated. There was a discharge of about a quart of tubercular fluid. Carried finger down into the pelvic abscess cavity; found it extended to the crural arch. Cured and washed it out with bichloride solution; treated

gluteal abscess in the same manner and inserted drains. Next carried a curved uterine dressing forceps through the sinus behind psoas muscle to upper border of the first lumbar vertebrae; cut down through the muscles at this point and carried a tube through from crest of the ilium to the last rib; next enlarged opening under the last rib, and carried a probe up in front of the transverse processes to the body of the tenth dorsal vertebrae, and here struck dead bone, which I partially curetted with a small bent instrument similar to Simms' uterine curette. It was, however, impossible to curette thoroughly, owing to the interference of the transverse processes. I succeeded in carrying a drainage tube into the body of the bone between the transverse processes of tenth and eleventh vertebrae, through which the pus discharged freely. In twenty-four hours temperature was 104° ; in thirty-six hours, $98\frac{1}{2}^{\circ}$. From December 27 to March 4 temperature fluctuated between $98\frac{1}{2}^{\circ}$ and 100° , averaging about $99\frac{1}{2}^{\circ}$. April 5 placed her in Sayre jacket, which she wore four weeks, and during this time she walked about the hospital with ease; temperature averaged 99° . June 8th renewed Sayre jacket. June 17th manifested lung symptoms; advised her to go into the country, hoping a change of air would do her good. Temperature 100° . The sinuses were all healed in two months after the operation, excepting the one going directly into the body of the tenth vertebrae, which still discharged a little pus at times.

Six months after her departure from the hospital she died of tuberculosis of the lungs. This patient was very comfortable for four months, from January 10th to June 1st. Almost entirely free from pain and had perfect use of her limbs.

History.—Case 2. Miss H. W., age 21 years, entered Wesley Hospital March 26, 1890, considerably emaciated. Mother and father in good health. Sister died of consumption at the age of 22 years. About one year ago our patient began to feel pain in the back of her neck upon rising from

bed, which became more and more severe, and in about two months' time extended to the left arm, which was soon paralyzed. She lost entire use of the arm. After another two months the arm began to improve, but her neck grew worse, and for one month she lost her voice, which, however, came back suddenly. Then her face began to swell and teeth decayed rapidly. Soon after restoration of voice she noticed a swelling in the left sub-occipital triangle, which constantly increased in size until it had filled the entire posterior triangle. All this time patient suffered excruciating pain day and night at the back of her head and neck; also over left shoulder, left arm and ulnar side of corresponding hand. She also experienced difficulty in swallowing. I found a large hard tumor situated at about the middle portion of the left side of the neck pressing the sterno mastoid muscle outwards and forwards. The common, internal and external carotid arteries appeared to be pressed forwards in front of the tumor. The neck was slightly flexed to opposite side. With index finger inserted through the mouth, a convex projecting tumor could be felt encroaching upon the lumen of the left half of the pharynx. Retaining finger in pharynx and placing the other hand over the outside of the tumor in the neck, I could feel that the pharyngeal growth corresponded to the cervical. No fluctuation. The tumor seemed as dense as bone, and as large as a medium-sized orange. It was variously diagnosed by different physicians. One called it a cancer; another fibroma. I concluded that it was either an osteo-sarcoma or abscess from caries of a cervical vertebra. The extreme hardness being the only doubtful feature with reference to the latter. March 31st I concluded to operate, with the assistance of Drs. Danforth and Greene. Made a large incision behind the sterno mastoid muscle, avoiding the branches of the cervical plexus, which were carefully drawn aside as the dissection progressed. Immediately after cutting through the deep layer of the cervical fascia fluctuation

was apparent. I opened the wall of the abscess. There was a tremendous gush of blood, which was soon followed by cheesy matter. The blood, however, continued to well up at a great rate. I quickly dipped my finger into the cavity and found a very large excavation in the body of the fourth cervical vertebra, in fact, there seemed little left of the bone. Cured the walls of the cavity and stopped hemorrhage by packing the hole with strips of iodoform gauze, and placed patient on her back without pillow for head. On the third day took out packing and inserted drainage tube. She could not hold her head up, as the supports were gone. Her neck felt as if it was broken. Kept her in bed about two weeks. The wound discharged a little for four weeks. After the second week adjusted a jury mast to her head and back, which permitted her to walk about. All pains were gone excepting a local tenderness of the spine. Twenty-four hours after operation temperature ran up to 101° . It was normal four-fifths of the time from day of operation until her discharge May 15, 1890. Three months ago her mother wrote me that her daughter had laid aside her jury mast, could hold her head erect, and was engaged about the house doing housework; was feeling well.

Case 3. Mr. H., aged 35 years, horse shoer, admitted in Wesley Hospital January 28th, 1891. American. Patient had inflammatory rheumatism when a child. "Some years ago" had typhoid fever. Had been quite well for many years preceding the present illness. One year ago last October he was bruised in the back by a refractory horse, has had slight backache ever since, in the sacral region. Last March he began having pain in the left hip, and was treated for three or four months for sciatic rheumatism. In September a swelling on the hip was noticed and his doctor cut down upon it, finding tubercular fluid. There have been several attempts to find the origin of the discharge, none of which have been successful.

Examination.—Patient is quite emaciated, but says he has a good appetite. There are several large scars on his hip from previous incisions. There is also a triangular opening on the gluteal region, high up over the back of the ilium, which communicates by a sinus six inches long with one over the trochanter major. There is a free discharge of pus from both of these wounds. Lungs in good condition. Bowels loose. He is too weak to sit up. Pulse 113. Temp. $101\frac{1}{2}^{\circ}$. Exploration of wounds reveals necrosis of trochanter major, on its posterior border; quite an excavation exists here. Several sinuses are present, one extends directly through the thigh to its inner border behind adductor muscles, a second sinus leads up to the back of the ilium, and a third one communicates with the pelvic cavity. I passed a flexible uterine sound into the latter opening behind the tuberosity of the ilium, back of the rectum to the anterior surface of the sacrum, a distance of nine inches. The probe struck denuded bone on the anterior surface of the body of second sacral vertebra towards left side. The patient complained of great pain over the sacrum. His legs were strongly flexed. The psoas muscle of the diseased side was contracted.

Diagnosis.—Caries of the sacral body with secondary infection of trochanter. February 9th, with assistance of Drs. Danforth, Sage and Miller, I concluded to scrape the dead bone and drain the parts diseased. First cut down on trochanter and chiseled away the diseased tissue. Next made a vertical incision one and a half inches to the left of the spinous processes of the last lumbar vertebra, extended this incision into the back of the sacrum. This cut led me into the triangular space below the transverse process of the last lumbar vertebra, bounded below by the body of the sacrum, at its outer side by lumbo-sacral ligament, limited internally by the body of the last lumbar vertebra. Through this opening (2 inches deep) I passed my finger and hooked it over the anterior surface of the sacrum into the pelvic ca-

vity. With a bent probe reached the diseased bone, then introduced a bent curette with flexible handle, and curetted as well as possible the second sacral segment, which was necrosed, also lightly scraped the long sinus from below, and finding it impossible to carry a tube from the lower opening at the trochanter through pelvic cavity to the upper opening at the top of the pelvis, distance of ten inches, I concluded to make a sally by way of the great sciatic notch, half way between the two openings. I therefore cut through the gluteus maximus muscle to the upper border of the notch, and thrust a uterine sound, bent into a half circle, through this opening over the front of the sacrum and the promontory into the upper opening. As this opening was two inches deep, it was not possible to bring the sound to the surface, but, with the assistance of Dr. Danforth, a silk thread was fastened below the bulb of the sound and carried through the pelvis, a drainage tube was now attached to the lower end of the thread and drawn through, giving an excellent drain to the diseased bone. Another drainage tube was carried through the thigh transversely behind trochanter and adductor muscles, and a third drain inserted for the trochanteric cavity. Twenty-four hours after operation his temp. was 99° . It fluctuated between normal and 102° , averaging about $99\frac{1}{2}^{\circ}$, until the day of his discharge, March 4, when it was normal. About ten days ago I received information that he was able to sit up and that the wounds were almost healed. There was still a little discharge from the trochanteric wound. In this case we examined the discharge at the hospital and found bacilli. The operation was undertaken with the hope of relieving to some extent the sufferings of our bed-ridden patient, and he certainly has been more comfortable since the operation, although ultimately I fear he will die of tuberculosis of the lungs.

Spinal Surgery has assumed an extraordinary degree of importance since the year 1887, following the report of Horsley's first operation for neoplasm, and since then a number of operations have been done for caries and traumatism. I hold that the necrosed bone of the spinal column should be treated upon the same principles as similar disease in other bones. In other words, when we are certain that suppuration exists, we ought to endeavor if possible, (providing that systemic conditions or other complications do not contraindicate) to reach the seat of the disease, remove all that we can of the dead tissue, and establish thorough drainage, for we know that a long continued suppuration, with the accompanying infiltration of pathogenic fluid, must soon undermine the vitality of our patient, and the paralysis accompanying many cases must be attributed to the inflammatory and suppurative processes causing pressure upon the cord, rather than to the disease of the cord itself. (See paper of Dr. Geo. E. Eliot, N. Y. Medical Journal, June 2, 1888.) Grave as these operations ever must be, the experiences of Drs. Morenan, Horsley, Abbe, Lane, Duncan and White (Annals of Surgery, July, '89), it seems to me fully justify the procedure. These operators had ten cases of laminectomy (for caries) of the gravest variety. They report three recovered, four improved. One of complete paralysis of all four limbs recovered. One with incontinence of urine and faeces with complete sensory and motor paralysis was also cured; a third one with paralysis of lower extremities recovered perfect motion of both legs. In two of these we are told that the laminae and spinous processes of the three successive vertebrae were excised, a most formidable operation. In view of these facts it appears to me that the old method of opening a Psoas abscess a foot or more from the point of disease without attacking its *fons et origo* is unphilosophical, irrational and decidedly unsurgical. In cutting down upon the diseased body of a vertebra it would

seem extremely desirable to avoid opening the spinal canal, to prevent injury to the cord, to avoid hemorrhage into the canal or even infiltration of septic matter, and this should be done before paralysis occurs if possible, or at least as soon as an abscess appears with pressure symptoms. Such operative procedure is however not simple, as any surgeon who has made the attempt will attest, especially in the dorsal region. Laminectomy at this time of course defeats the object sought. With a view of ascertaining how to accomplish this most effectively and directly, I instituted a series of experiments upon the cadaver. In the cervical region it can usually be accomplished most readily by following up the sinus of the abscess cavity, or as has been done in the upper region through the pharynx *via* mouth. In the lumbar region an incision over transverse processes through the superficial tissues and along the border of the multifidus spinae muscles, $1\frac{1}{4}$ inches from the spinous processes, enables one to get behind the psoas muscle, (as in Case 1 reported) to the vertebral body. The diseased sacral body can be reached as in Case 3, via the triangle between the transverse process of the 5th lumbar vertebra and the base of the sacrum, also through the great sciatic notch, through or back of the rectum, or by trephining through the bone from behind, in the dorsal region between the transverse processes, but the space here is so narrow as to preclude the possibility of thorough treatment. I therefore incised the soft tissues one inch from the spinous processes, uncovered and removed the transverse process of the diseased bone, or of the one just below it, and resected the head and neck of the corresponding rib. This permits a large finger to reach the postero lateral angle of the diseased body, and gives room for the introduction of curette, sharp spoon, or forceps, and leaves a large space for drainage tube. Should it be desirable to carry the drainage tube through the column, a transverse process with end of the rib of the opposite side can also be removed, when it can be read-

ily passed through. In doing this operation we must avoid the pleura, dorsal ganglia of the sympathetic, spinal nerves, and intercostal arteries. One can hardly avoid injuring the artery. The other tissues need not be damaged. Hemorrhage can be controlled. The difficult part of the operation is in disarticulating the head of the rib, as it is deeply placed and firmly attached. To avoid injuring the pleura and ganglia of the sympathetic, it is a good plan after sawing through (chiseling or cutting with bone forceps) the rib at its tuberosity, to strip off the periosteum in front of the neck and head of the rib. The transverse process I remove with chisel. The disarticulation of the rib can be done with scissors or knife, by following the attachments of the ligaments about the neck and head of the rib. The operation is practicable, less formidable than laminectomy, the latter operation involves more cutting. The spinal supports are not so much weakened and the spinal canal not opened, unless the back portion of the vertebral body is destroyed. Even then the posterior common ligament may protect the canal. Of course it is to be understood that the operation is not intended to take the place of laminectomy in cases of great angular curvature, but to be resorted to before the disease has produced any great deformity as soon as an abscess has been discovered.

